ROLE OF NRENS IN FRAMEWORK OF INFORMATION SOCIETY

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Abstract.

All levels from top-politics to grassroot NGOs discuss concepts of Information Society and Digital Divide extensively during recent years. NRENs represent a special element in this framework, which role may differ in developed and developing worlds - if long-term targets may be the same, departure points are different and paths lie in different contexts, which many times are not considered. NRENs may play a significant role for reduction of digital divide and as a model of future information society structures, but such roles may be overshadowed from actuality (needs, resources, concepts, practices) and/or corruption. In this context the synergy between main actors within academic communities, together with minimal but permanent support from both governments and international funding bodies are crucial for long-term stability of NRENs. This implies the necessity for productive negotiation and organization between themselves, with governmental bodies and international organizations.

Introduction

Talking about NRENs in framework of Information Society and Digital Divide, it means "big politics". It is part of a global discussion flourishing from grass-root NGOs to top-level politicians in worldwide summits. Even the notion of "information society" is an old one that emerged in early seventies; its publicity was during nineties when a wide community of technicians worked to fulfill the motto of Vint Cerf "*let Internet go there where no network has gone before*". First of all it had to do with less developed countries, opening the way for a reduction of what become usual to call "digital divide". NRENs had a special role in this process – Internet itself was a product of research communities; and in less developed countries these communities were the first to get into contact with Internet. But the World does not wait for us to catch new things – it runs forward and today we hear about a second stage of the Internet revolution – Internet2, GEANT, GRID etc. What means all this for us coming from less developed World?

In two words it is called "Digital Divide". It is not "one has access to high-tech, the other not". Considering the Information Society with the words from Bangemann report, new technologies of information and communication (ICT) "change the way we live together and we work together". From a strategic point of view, it means that in the so-called "Information Society" information will play the role of capital. Having no access to high-tech will mean "no capitals" with all its economic and social consequences. And it is not simply "access to technology" – it has to do with a complex of social, economical, political and mentality factors. Practically we have some access in new technologies, but during a survey carried our for the SEE-GRID project, it was seen that less developed countries are "MS-Windows oriented", while developed ones more "Unix oriented". This is not a technological condition but it has deep negative impact when we try to implement new technologies that are still in experimental stage. And it happens in those circles that are supposed to me more advanced – research and education.

"Divide" between us

We want to understand the role of NRENs in framework of Information Society, and how these organizations may help to reduce the Digital Divide. We have discussed a lot about NRENs, and if we need few political words about it, lets read the words of Erkki Liikanen, Member of the European Commission, Responsible for Enterprise and Information Society: "the interconnection of the National Research and Education Networks (NRENs) in Europe has a very high political importance as it constitutes one of the major building blocks for the Next Generation Internet and the foundation for the European Research Area (ERA)". It looks quite convictable, but it is said for developed part of Europe, and when trying to match it with less developed context, it reminds about certain "cargo cult" discovered a long time ago between some cannibals.

Hundred years ago in places like New Guinea, autochthonous people saw white managers building some store houses and write some letters and all goods come from "nowhere" in a short time. They

built for themselves some "store houses" and started to write pieces of letters, and nothing happened. It was called "cargo cult". Ten year ago, when ICT terminology was becoming popular in politics and lot of projects were "exported" from developed towards developing world, voices from research community warned publicly "beware of cargo cult". Nobody heard, and one year ago some important European structures working on development of Southeastern Europe re-discovered that "ICT cannot resolve underlying institutional deficiencies", but only after lot of money and efforts were gone with the wind. This is another expression of "Divide" that exists within different sectors of research, and between research and decision-making. In this context, we need to be very careful when speak about NRENs.

The risk is at our doors. Balkan countries had a good year in 2004, exploiting connectivity capacities offered by project SEEREN. But SEEREN was totally funded by European Commission, a phenomenon that will not happen any more. What will be in 2005 and latter on is a big problem for less-developed countries. And if we may resolve it for 2005, what may happen in 2006? It has to do with a complex of factors we will try to explain in more details.

Some political considerations

If we would classify the complexity of different systems, we will find something like that:

Infinite complexity	Black Box
	Politics
	Society
	Economy
	Biological Systems
	Ecosystems
	Meteorology
	Process Control
	Mechanical Systems
	Electronics
Zero complexity	White Box

[Quaderni di Informatica, Centro studi Informatica e Automazione Bull Italia, no.2, 1992]

Technically speaking, we have to deal with politics and it seems to be a multi-dimensional system where all dimensions are different between themselves, as well as the same dimensions in different contexts, situated somewhere in the frontier with infinity. In a period of several decades there are a lot of research and publications on social and political aspects of new technologies and in particular of ICT. Several important conclusions emerge from a global evaluation of all this research:

- New technologies are "tools", not "solutions"
- Technologies are neither good or bad, neither are neutral (Kransberg Law)
- The same factors may have quite different impact in different conditions or different quantities.
- Technologies are developed in specific social conditions. While exporting in other conditions, the difference of rationalities must be accounted, especially differences between developed and less developed.
- Each country has to find its own way, but need to learn from experiences of others. In the era of Internet and globalization these specific ways need to converge with each other in order to avoid clashes.
- We need to learn from past errors. Unfortunately people do not learn from past errors, especially in systems of high complexity. Even in ICT domain we see repetition of the same errors for 40 years.
- The key for sustainable development lies in motivation of people. Unfortunately, an old proverb says "better an egg today [*for myself*] than a chicken tomorrow for the [*family*]". Consider this proverb in context of a multidimensional social and political domain in transition...

European Union needed a strategic document to put objectives for the development of ICT in nineties. Similar strategies are seen to have been compiled in other developed countries. Following their example, ICT strategies were compiled in less developed countries as well, and it was an expression of "cargo cult". It is not that we do not need strategies; perhaps we need them more than developed countries. The problem has to do with underlying concrete national political background – which is the real political will of our leaders? The answer to this question defines the importance and the role of any kind of strategies – to be used as a tool for national progress and regional integration, or a tool to concentrate power in few hands and manipulate projects and funding. The NRENs cannot escape from such sinkholes.

In case of Albania we have a national strategy for ICT, developed with the initiative of UNDP and aided also from Soros Foundation. It is an official document approved by government in April 2003. God knows what is happening with it now, and many people have started to consider it as a joke. Development of Albanian NREN is included in this document:

"High speed networks linking academic organizations will open up possibilities for collaborative learning and researching and offer substantial potential for innovation. It will offer Albanian universities and research institutions the possibility of playing an effective role in research projects in the country and internationally. It will also allow for interactive multi- media courses worldwide, experimentation with new forms of services and the development of new applications. The existing national academic network should be upgraded, and high speed and broadband academic network access developed with high urgency. Links will be built to academic or research networks in the US and the EU, and collaboration established with the European project GEANT. Implementation will be achieved using a phased approach, starting with the universities and research organizations in Tirana, and then linking the other universities in the country.

But it seems that respective government institutions will be interested on it only when some money will be visible in the horizon. In beginning of 2005 we will learn how much our government is interested in development of a NREN when respective institutions will approve requests and define the state budget, if we will succeed to get the necessary budget for continuation of SEEREN. We must not be surprised if everything may fail when some minister would ask, "What the hell they need it"? Similar thing happened in one of CEENet country a couple of years ago when a minister destroyed an organization (legal body of NREN) without being able to recreate it. It may happen again in some other less developed country, even if today it may seem flourishing, if political conditions would change.

What is the role of a NREN?

We know what is a NREN: "National Research & Education Network".

The crucial question is "what is the role of a NREN"? It is worthless to hurry to give an answer. For technicians and neighbor managers is easy to find an answer, but it is necessary to have in mind politicians and high level decision-makers, so the answer may have some positive impact in their minds. In few words, we need a NREN to reduce digital divide, but we must avoid the cargo cult phenomenon.

What is a NREN, a service provider or a special laboratory? We may answer "both", but the balance between these two components may be very important. That balance depends on the history and concrete conditions of each country. Research and education in developed countries need high capacity links to collaborate with each other, especially with special centers of research as CERN for example, and ordinary ISPs cannot offer them requested capacities. In that context Liikanen considers GEANT as very important, because it is a necessary network that makes possible lot of other research and education processes.

In less developed countries researchers may need more Internet connectivity with developed world than with each other. Institutional networks may be less developed and a great part of the community (especially students) may not have regular access to networks and services. In is not a surprise that in less developed countries cyber-cafes are flourishing. As consequence, considering the fact that bandwidth requirements are relatively not high, it is normal for someone to make a question "why you

want to do it by yourself and not buy it in the market"? This question matches perfectly with actual management theories and practices imported from developed world which tendency is to buy services in the market. Moreover, this possibility may seem very interesting for certain decision-makers – buying the service in the market means play with money.

Actual global political tendencies are giving a high priority to private sector, and governments prefer more to create PMUs and PIUs and other "mushrooms" like that instead of working with existing public R&D institutions. Such management way permits all kind of people to be involved in research and education policy-making, and the courage of such pop-up people goes far away: in a recent conference someone presented crazy ideas that even universities are not anymore necessary because people may learn in the Internet. Such people happen to be near policy-making levels, and their voice may have a negative impact. Some government closes down a center for documentation and information with the motivation "there is no need for such centers in the era of Internet", in a time when World Bank invests for creation of national information gateways (for example).

It is wrong to say that even in developed countries there are the same negative phenomena as in less developed ones; it is true but considering the complexity of economic, social and political conditions the impact of these phenomena may be quite different. Human beings are the same, but in different geographical and historical conditions their development varies a lot. It must be considered in order to use good definitions for a NREN, matching at the same time global principles and concrete conditions of particular countries, giving right arguments for a minimal but crucial support from governments.

We need to consider NREN as a special laboratory, as an "inevitable luxury" forced by rapid revolution of ICT and its applications. If country's dream is developed World, we must understand that this World is becoming day by day a "networked technological information society", in other words a "knowledge society", and in this context we need to accept and inject in decision-making two postulates:

- Research and Education Systems are "promotion engines" and "direct indicators" for development and emancipation of society. Reduction of Digital Divide has to do first of all with our children and their education is crucial. Education may become quite formal and ineffective if not supported by appropriate research based on concrete conditions and needs of the country.
- NRENs are "promotion engines" and "direct indicators" of development and emancipation of Research and Education Systems. Both high-level research and education are built over global networking. In this context NREN is a special laboratory to experiment new technologies and services, to build local content and exploit others content as well.

In the context of less developed countries, characterized by lack of financing sources, balancing between theoretical needs (in order to reach developed countries) and the reality is critical for the sustainability of a NREN.

Challenges for building a NREN

We may to consider NREN as a special laboratory, as an "inevitable luxury" forced by rapid revolution of ICT and its applications, but the question "why will serve a NREN" need an answer. The ways for development of NREN as a complex of technological, organizational and legal structures depend on the answer of this question.

In less developed countries a NREN would serve to:

- Offer Internet connectivity to academic community, but presence of private ISPs while bandwidth requirements are not high and control over QoS offered by ISPs is impracticable may lead to neglecting of this argument.
- Acquire knowledge on large-scale networks and their technologies, but this objective touches a small part of technical community, and it may not be a sufficient argument.

There are two other arguments that may force decision-making to accept a minimal support for a NREN:

- Production and exploit of local content; and

- Stimulation of collaboration between institutions.

These arguments get real value when:

- There is political will to develop education and research systems;
- There is synergy between different academic actors;
- There is a critical mass of content developers and content users.

In less developed countries these conditions may be undermined by cases of pragmatic and profit-oriented policies and practices of both levels: decision-making and technicians. A big difference between developed and less developed countries lie in the fact that, while in developed countries the work market is stabilized, in less developed countries work market is disturbed seriously by both local private and international work markets. It is always the "egg and chicken" story already mentioned.

Certain categories of decision-making consider more profitable for them to monopolize the use of funds and other resources, instead of distributing competences and get personal profit from global progress of the country. Forget about electoral promises – their value in less developed countries is also "less developed". We may call it "corruption", or politely "manipulation", it may be illegal or supported by the law. For example, actual legislation in Albania concentrates the responsibility of public tendering in few central institutions. Consequences are grave due to lack of possibility to finalize procurements of equipment and services, as well as lack of possibility to avoid those providers that are known for bad quality. We may condole ourselves that basic Internet technologies may run in old computers, but it becomes a real obstacle when collaboration with western countries is considered. In this context, it is crucial for developed countries to take into consideration such different rationalities in all their aspects when making policies for international collaboration.

But problems may lie, perhaps in hidden forms, within the academic community itself. Level of local companies is still inadequate for a sustainable partnership with public research institutions. Due to low salaries, and sometime even working conditions, motivation of public academic community remains critical. Brain drainage is a typical example – talented young people prefer to go abroad or work in private companies, they have better financial alternatives. Application of regulations hired by developed countries may be deadly just because of different conditions of their application. For some time less developed countries need to apply particular financial rules to stimulate public researchers and educators. This is particularly important when creation of local content is considered, due to great amount of human work it requires. This fact must be well understood by policy-makers in both local and international levels. Again we have to do with political will for real and fast progress and development.

Other important aspect is synergy between different potential stakeholders of the NREN. Positive synergy would lead to a bottom-up development of the NREN through creation of certain inter-institutional organizational structures that would look for funding from different sources and put governments before a "fait-acompli", community is able to show in concrete way that it is able to build the network, operate it, create local content and exploit it for research and education, and it needs funding to keep it running. This synergy depends mainly in mentalities of people, and also in potential conflicts of interest that may emerge. Mentalities have to do with how much a person is oriented to work in a team sharing responsibilities and profits. Conflicts of interest may be of two categories:

- Institutional – who will control the network (and related funding and projects). Alternatives like Virtual Network Operating Center (VNOC) may be a solution if there is the good will to join together.
- Individual – when some key persons that would be involved with managerial and / or technical aspects of the NREN are involved at the same time in concurrent activities, or in such positions that have the possibility to manipulate the process.

In both cases we may have "negative synergy", that is people comes together to talk about options for the development of NREN, but instead of trying to find solutions they try to find obstacles. Such

"negative synergies" may negate even the role of a "champion", that is a preferred concept introduced in ICT related strategic documents and used to point out certain individuals or institutions that may be well in advance of technological deployment processes and serve as a orienting point and good example to the rest of community. An old proverb says "brave man with many fellows"... Transparency of processes and projects is only a necessary (but not sufficient) condition for positive synergy, and to much transparency may have negative impact leading different actors to interfere with internal affairs of each other.

Discussion of technological alternatives is a typical example of the "negative synergy". Formally you have discussion for the benefit of all. In reality, due to the fact that there is not perfect solution, it is always possible to find contra-arguments for any technological solution proposed, and no solution ma be adopted, leading to failure of projects with all the consequences of such failures in a contradictory environment. A special technological problem is related with the connectivity of sites in remote regions, where it is practically impossible to find solutions independent from public operators. In less developed countries it may be only one incumbent public operator able to offer its own solutions for inter-city connectivity and this implies monopolistic behaviors that add difficulties to find supportable for NRENs solutions. This particular problem represents a big challenge for emerging NRENs, and it needs special attention by international donors.

Conclusions

In less developed countries academic communities need NRENs to reach easier developed ones and integrate internationally. International integration means playing a measurable role in international research and education processes, it is not simply participating because of regional concepts in projects as SEEREN or SEE-GRID (for example). The ways a NREN evolves in a less developed country differs from what happened in developed countries, due to differences in history, reality and rationality. These differences must be taken into account when policies for development of NREN are designed and applied.

If successfully developed, a NREN may have a strong impact pushing the whole academic community towards effective collaboration within the country and with abroad, especially in regional scale. A well-developed academic community serves as a concrete model for the whole society and as a strong support for education of new generations. It is a concrete contribution for reduction of digital divide and evolvement towards the information society. But, NREN is only a tool, not a solution.

Achieving the progressive role of a NREN in less developed countries may be possible if certain internal and external conditions are fulfilled:

- Political will of decision-makers for real progress of the country;
- Positive synergy between the academic community, especially between ICT departments of different institutions;
- Understanding strange realities of less developed countries by international donors, who need to shape their policies and practices depending on differences of rationalities between developed and less developed communities.

The last "universal" argument is that the history does not give any value to arguments and justifications, for it the only thing to be concerned is "what we will leave to new generations". If we are not able to create a sustainable NREN, it will be our shame. If we create a NREN through opening new problems, again it will be our shame. The key to have some success is the concrete work – if each of us will do something concrete, together with its neighbor, and all we would come together to talk what to do together as next step, we will do something for good even when political climate may be negative. We are already "out of time", and we have to time to spent talking or sleeping.

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